



## UNIVERSITI TEKNOLOGI MARA

### DSC764: OPERATIONS ANALYTICS

<b>Course Name (English)</b>	OPERATIONS ANALYTICS <b>APPROVED</b>
<b>Course Code</b>	DSC764
<b>MQF Credit</b>	3
<b>Course Description</b>	This course is designed to impact the way of thinking about transforming data into better decisions. Recent extraordinary improvements in data-collecting technologies have changed the way firms make informed and effective business decisions. This course focuses on how the data can be used to profitably match supply with demand in various business settings. The students will be taught on how to model future demand uncertainties, how to predict the outcomes of competing policy choices and how to choose the best course of action in the face of risk. In addition, this course will utilize the latest operations analytics tools to drive a good operational outcomes and deliver results that are both definitive and measurable.
<b>Transferable Skills</b>	Excel solver skill to solve the problem
<b>Teaching Methodologies</b>	Lectures, Lab Work, Tutorial
<b>CLO</b>	CLO1 Apply software (Excel Solver or QM for Windows) to solve problems. CLO2 Display various quantitative techniques of Operations Analytics in planning for optimal solutions in organizations CLO3 Develop critical thinking to formulate problems in areas ranging from engineering to management CLO4 Interpret operations analytics for optimal solutions in organizations
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	
<b>1. Introduction to Operations Analytics</b> 1.1) What is Operations Analytics? 1.2) Characteristics of Good Decision 1.3) Operations Analytics Models 1.4) The Operations Analytics Approach to Problem Solving	
<b>2. Linear Programming (LP)</b> 2.1) Two-Variable LP Models 2.2) Graphical LP Solutions 2.3) Selected LP Applications 2.4) Computer Solution	
<b>3. LP: The Simplex Method and Sensitivity Analysis</b> 3.1) Transition from Graphical to Algebraic Solutions 3.2) The Simplex Method 3.3) Artificial Starting Solution: Big-M Method, Two-Phase Method 3.4) Special Cases in LP 3.5) Sensitivity Analysis 3.6) Computer Solution	
<b>4. LP: Duality</b> 4.1) Definition of the Dual Problem 4.2) Primal-Dual Relationship 4.3) Economic Interpretation of Duality 4.4) Theory of Duality 4.5) Dual Simplex Method	

**5. Transportation Model**

- 5.1) Formulation as Linear Programming Problem
- 5.2) Initial Solution
- 5.3) Optimal solution: Stepping Stone Method, MODI Method
- 5.4) Degeneracy, Multiple Optimal Solutions
- 5.5) Unbalanced Transportation Problems
- 5.6) Maximization Problems

**6. Integer Programming**

- 6.1) Integer Programming Formulation
- 6.2) Enumeration Method
- 6.3) Branch-and-Bound Algorithms

**7. Simulation**

- 7.1) The Simulation Process
- 7.2) Advantages and Disadvantages of Simulation
- 7.3) Generation of Random Numbers
- 7.4) Monte Carlo Simulation

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Case Study	Case study 1	20%	CLO2
	Case Study	Case study 2	20%	CLO2
	Group Project	Project in finding optimal solutions for the chosen organization	20%	CLO4
	Test	Test 1	20%	CLO1
	Test	Test 2	20%	CLO3

Reading List	Recommended Text	<ul style="list-style-type: none"> <li>• Lieberman, Nag, Basu Hillier 2017, <i>Introduction To Operations Research</i>, 10th Edition Ed., 20 [ISBN: 9789339221850]</li> <li>• David R. Anderson, Dennis J. Sweeney, Thomas A. Williams, Jeffrey D. Camm, James J. Cochran 2018, <i>An Introduction to Management Science: Quantitative Approach</i>, Fifteen Ed., Cengage Learning [ISBN: 133740652X]</li> </ul>
	Reference Book Resources	<ul style="list-style-type: none"> <li>• Edwin K. P. Chong &amp; Stanislaw H. Zak 2017, <i>Introduction To Optimization</i>, 4th Edition Ed., John Wiley &amp; Sons [ISBN: 9788126567898]</li> <li>• Hamdy A. Taha 2016, <i>Operations Research</i>, 4th Edition Ed., Pearson [ISBN: 0134444019]</li> <li>• Taylor B. W. 2017, <i>Introduction to Management Science</i>, 12 Ed., Prentice Hall [ISBN: 9332579423]</li> <li>• Ronald L. Rardin 2016, <i>Optimization in Operations Research</i>, Prentice Hall [ISBN: 0134384555]</li> </ul>
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	